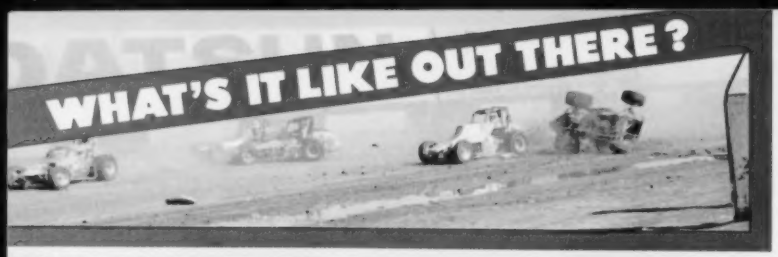

SEPTEMBER
1981

DRIVER

AT THE CROSS ROADS

DRIVER

FOR YOUR BODY ONLY

It has been said that if all drivers and passengers in this country would wear their seatbelts at all times:

- 15,000 fewer lives would be lost each year
- the severity of almost four million personal injuries would be reduced every year
- the present 20 billion dollars in costs incurred through motor vehicle accidents would be substantially reduced each year and
- the total number of motor vehicle accidents would probably decrease.

Those are some impressive effects that all of us would like to see. The device that could do all this for us is so simple. The car passenger pulls it

YOU the passenger as well as YOU the driver

across his or her body, fastens it and then forgets about it. It is comfortable, it doesn't interfere with movement, and it always does its job of keeping the passenger out of harm's way.

The trouble is, most people do the "forgetting about it" *before* they buckle their seatbelts. Most surveys done on seatbelt usage show only 10 to 15 percent of American motorists buckle their seatbelts.

Of course, the choice of using the seatbelt or not is yours, but you should be aware of some facts before you ignore that special nylon webbing. We want to look at a few different subjects: What seatbelts can do *if* they're worn; what causes the injuries to people who don't wear them; and a few of the real reasons people have for failure to buckle up.

The second collision: First, the injury story. It's not the car-to-car (or car-to-tree) collision that hurts, it is what's called the "second collision," or the "human collision." When an automobile hits something, it crushes somewhat as it absorbs the force of the impact and stops. However, the unrestrained driver and passengers in the car will still move at the car's pre-collision speed until their bodies are stopped by something. They, too, will crush as they absorb the impact of the accident.

This separate, second collision will be the people against the dashboard, steering wheel, windshield, doors, or other parts of the car's interior. Since the human body was not designed for high-speed impact with such hard objects, the people will suffer injury, perhaps even severe injury or death. (For a more in-depth, technical analysis of injury-causing accidents, from an auto racing perspective, see *"What's It Like Out There?"* on page 6.)

The collision of person against car interior is only one kind of human collision. The others are collisions of people with other people and collisions of people with things outside the car.

Person-to-person collisions: Which way does a person move in a car accident, toward the point of impact or away from it? The correct answer is *toward* the point of impact, despite what might be expected. Since everyone in the car is moving in the same direction, they collide with each other. These person-to-person collisions also can cause serious injury or death.

When the car has a frontal collision, the passengers in the back seat will be thrown forward into the people in the front seat, perhaps causing serious neck and spinal injuries. Bumping heads with sufficient force could even cause death. In a side collision, one passenger can collide with another and push him or her out a door or window.

A special case of person-to-person collisions is between an adult and a child. Parents often hold their children on their laps as they ride in the car. This is not safe, whether the adults are belted in or not. If the adults are not wearing seatbelts, they can be thrown forward, crushing the children between their bodies and the dashboard. If they are wearing their belts, they will not be able to hold onto the children in a crash.

Tests using belted-in adults holding 20-pound dummies have proved this. At 30 mph, and even at 15 mph, adults in the test were unable to hold onto the dummies. At 30 mph, a 20-pound child will hit the dashboard with the force of a 300-pound adult.

We add that in crash tests, the people involved know when the crash will occur. If they can't hold on when they know, how could you hold onto your child when you didn't expect the crash?

Ejection: Another common possibility is being thrown out of the car. Often, an unbelted passenger will be ejected when the doors spring open in the crash, or he or she might go out through a window or the windshield. The car might then run over or crush that person in a rollover. Most often, simply the impact with the ground will cause serious injury or death.

A lot of people have the unfounded idea that they are safer if they are "thrown clear" of the car in a crash. The fact is that they are 25 times more likely to be killed. Just as the human body was not designed for high-speed impact with a windshield, it was not designed for high-speed impact with the ground or concrete or trees. It's better to stay inside the car.

And the only way to insure you'll stay inside is with the seatbelt.

How they work: The modern seatbelt and shoulder harness are specially designed for comfort, ease of use and effectiveness. In a crash, or in rapid deceleration, the belts lock up and prevent the passenger from being thrown into the doors or the dash or the other passengers.

Some seatbelt systems have a reel that is sensitive to any quick movement of the belt itself. If the belt feeds out too fast, the reel will lock up and the belt will stop the passenger from moving. The newer method involves a car-sensitive belt. If the car slows rapidly (in a panic stop or a collision)

continued

DRIVER

THE
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FOR THE MILITARY DRIVER

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HQ AIR FORCE INSPECTION AND SAFETY CENTER
Norton Air Force Base, California 92409

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SEP

VOLUME 15 NUMBER 4

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THE EDITOR SPEAKS

DOUBLE CLUTCH

EDUCATION AND ENFORCEMENT, JAPANESE STYLE

In less than 10 years, the Japanese have reduced their annual traffic deaths by 50%. There are now 10.7 fatalities for every 100,000 Japanese, compared with our record of 22 for every 100,000 of us.

Joseph Kaplan of the National Safety Council says, "The Japanese approach has been to develop improved behavior. That may sound simplistic, but it works."

Part of the Japanese effort has been more traffic police plus aggressive safety campaigns about visibility. Old people, who often walk along the shoulders of roads, are asked to wear bright colors. Almost all school children carry "Day-Glo" yellow book bags and wear white helmets when bicycling in rural areas.

Another part of the effort — the part that puts teeth into the rest of the program — consists of stiff penalties for drivers and motorcyclists who violate traffic laws. There is a special prison called Ichihara for persons convicted of causing death in a traffic accident, or drunk driving, speeding, or driving without a license.

Ichihara is more a rehabilitation center than a prison. The average sentence is 10 months, the average inmate age is 30. Most prisoners have prior convictions. Traffic violators are generally considered unstable and neurotic, so the prison seeks to make their personalities "more serene" by introducing a large amount of organization into their lives.

The Japanese are strict about driver's licenses. Ninety-five percent of applicants have been through one of the nation's 1,100 driving schools.

Of course, our traffic problems and our national views about "the need to drive" are quite different from the Japanese'. But we could cut our annual fatalities in half if each of us resolved to always fasten our seatbelt and never use any drug before taking to the road.

for your body only

continued

It's important for your passenger to wear the seatbelt too. Even if you are buckled in, an unbelted passenger could be thrown into you in event of a crash, causing injuries to both.

Wearing seatbelts will prevent you from hitting the instrument panel and the other passengers and it will keep you from being ejected from the car.

a special pendulum in the mechanism swings and locks the belt.

Seatbelts are the best restraint system because they protect in a collision from any side, and in case of a rollover, and in case of a multiple collision, when the car hits more than one object.

Seatbelts do more than keep people away from the hard car interior parts that will injure them. Seatbelts allow people to escape death or injuries by letting them "ride down" the crash impact. Injuries and death are caused when the person hits a hard object and has to absorb a great amount of force in a short time. For instance, in a car accident at 30 miles per hour, the car will stop in a tenth of a second. An unbelted person in the car will continue to move after the crash and will stop in a hundredth of a second. (See illustration on page 7.)

The difference in time is significant, because the person will absorb the force of the crash no matter what. If he absorbs it over a longer period of time he is safer, just as he is safer if he is pushed against a belt rather than thrown into a windshield.

If the person is unrestrained, he is moving independently of the car. He's on his own, and he will hit something hard. If he is buckled into his seatbelt he becomes, for crash purposes, almost a part of the car seat. He slows down *with* the car, or "rides down" the collision, using the full tenth of a second it takes the car to stop.

Seatbelts will also help you avoid accidents, or at least make them less serious. Sound far-fetched? Consider this: In a hard maneuver such as a violent turn to avoid a crash, the body is acted upon by G-forces that can push it away from the wheel. If the driver lost control in a collision, a minor accident could become a major one.

So seatbelts are a very good idea. They keep your body from hitting things in the car or other people; they keep you from being ejected from the car; they help you maintain control of the car, even in an accident.

And the reason is? So why, if they're such a good idea, do so few people bother to use them? Most non-users have a lot of pat, lame ex-

continued

continued

cuses like "They wrinkle my clothes," but what are the real reasons?

Many people are just lazy. They don't want to bother with anything they think will take a little effort. They don't realize that belt usage quickly becomes a habit they will do without thinking. Some people just don't want to think about the chance of having an accident, and so they "tune out" any attempt to get them to use their belts.

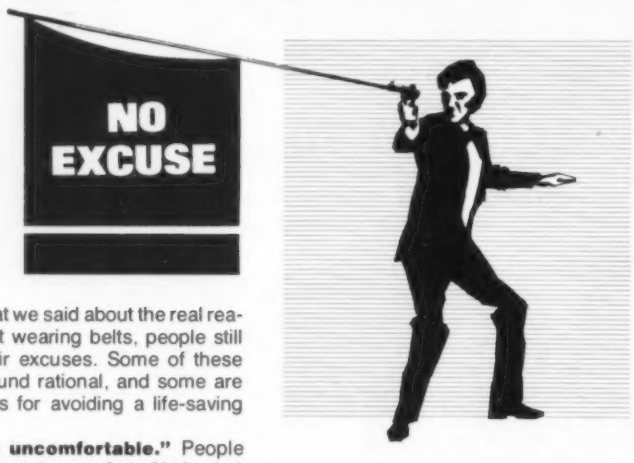
But we think the main reason is this: People don't believe they will have an accident. But every week about 900 Americans are killed in traffic accidents. Almost 10,000 people in this country are injured every day in car mishaps.

The National Highway Traffic Safety Administration (NHTSA) says "In the next 10 years of normal driving, it's almost a certainty that you will be involved in a motor vehicle accident serious enough to injure or even kill you."

According to some NHTSA statistics, more people in the 15-to-24 age group die in auto accidents than the older folks. People in that 10-year span account for about 16,000 traffic deaths each year. The 25- to 44-year-olds — a 20-year-span — have about 12,000 auto deaths per year. The 45 to 64 group, again a 20-year span, has only 8,000 traffic fatalities. And insurance companies charge younger people with higher rates because they have a larger risk of accidents than other drivers.

We're not making a negative statement about your driving ability. The only point we're making is that you, as younger drivers, stand a higher chance of accidents, and you should consider using your belts. Unfortunately, the only way to convince some people is when they actually have an accident, but that's too late. We want you to use the belts *before* an accident, so you are more likely to survive.

If you accept that statement about the probability of an accident in the next 10 years, you'll buckle up. You would if you knew what day the accident would happen, but you don't know. So buckle up every time you get into your car.



Despite what we said about the real reasons for not wearing belts, people still cling to their excuses. Some of these excuses sound rational, and some are bad reasons for avoiding a life-saving device.

"They're uncomfortable." People complain about the comfort of belts, but today's belts are really quite comfortable. The problem is that people are not used to them. If they become accustomed to seatbelts, they won't be comfortable *without* them. People say they don't like being confined, but the belts are adjustable and do not interfere with movement. They will allow you to bend forward to reach any of the controls on the instrument panel, and they will retract easily when you sit back. A lot of people fasten the belt and then slip their arm out of the shoulder harness. This is dangerous, because it eliminates the protection the harness provides — that of keeping your face away from the dashboard.

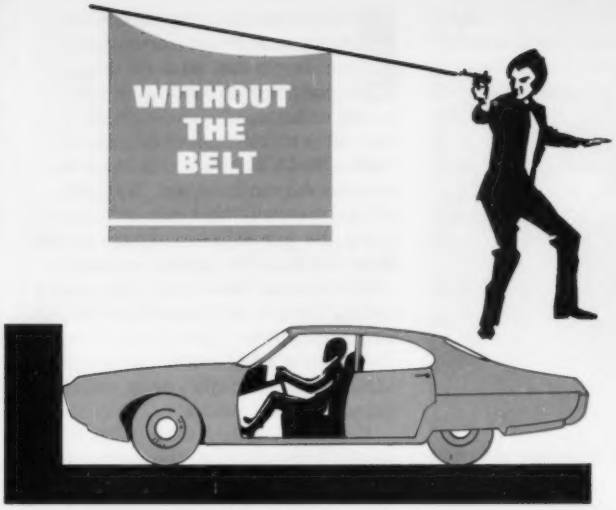
"Will they work?" The ease with which they move sometimes makes the wearer wonder if they will work when they are supposed to. The systems that are belt-sensitive will lock up easily when you move quickly or pull sharply on the belt and it feeds out more rapidly than it is designed. For the car-sensitive systems, those that lock up when the car slows suddenly, you can test by braking suddenly from a moderate speed. The belts will lock up and prevent you from hitting the steering wheel. By the way, do this only on a straight, level, dry road with no nearby traffic.

"They might hurt me." Some people are afraid the seatbelts might injure them in an accident. If you are thrown into the restraining safety of a seatbelt at 30, 40 or 50 miles per hour, yes, you might suffer some bruises. But those minor injuries are nothing compared to the trauma of hitting the wheel, dashboard, or other passengers, to say nothing of being thrown out.

"It's better to be thrown clear." We dealt with the myth of being "thrown clear" in the main article, but it bears repeating. You are 25 times more likely to be killed if you are thrown out of an automobile.

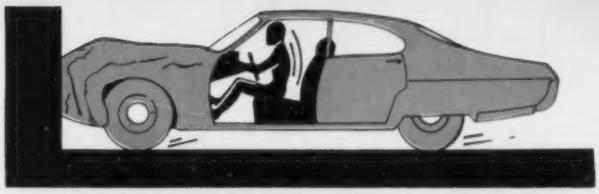
"I can hold myself." Another really dangerous idea is that a person can brace himself in a crash. But this faith in one's physical strength doesn't stand up to the facts. In a crash at the moderate speed of 30 mph, a human body is hit with the force equal to 30 times its own weight. Nobody can hold that much weight, even for an instant.

"I might be trapped." Many people have an unrealistic fear that they might be trapped in a burning car or a car submerged under water. The truth is that less than one half of one percent of accidents involve fire or submersion. People who use this argument are worried about being knocked unconscious and unable to get out of the car. They are much more likely to be knocked unconscious if they don't wear belts. Seatbelts and shoulder harnesses keep your body



0.000 seconds - car hits barrier

On impact, the car begins to crush and to slow down. The person inside the car has nothing to slow him down so he continues to move forward inside the car at 30 mph.



0.050 seconds - car crushes

The car slows down as the crushing of the front end absorbs some of the force of the collision. The person inside is still moving forward at 30 mph.

0.100 seconds - car stops
0.120 seconds - person hits car interior

One-fiftieth of a second after the car has stopped, the person slams into the dashboard and windshield. This is the human collision. In the car's collision it takes 1/10 of a second to stop; in the human collision it takes only 1/100 of a second.

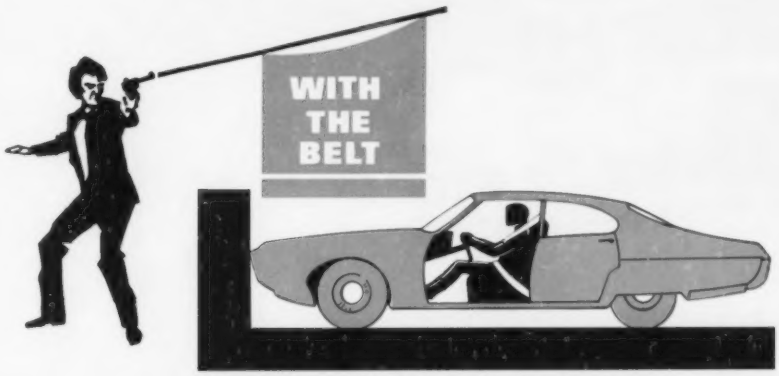
from hitting interior car surfaces so that you remain conscious and able to release the belt.

"I'm not going far." The length of the trip doesn't matter. You need your seatbelts at all times. Most accidents happen within 25 miles of home, and 80 percent of all accidents happen at 40 mph or less. Obviously, it's the short trip that is the most dangerous.

"I'm a good driver." Some people think it is an insult to the driver to use a seatbelt, and that a driver who uses a belt has no faith in his driving skill. That's foolish. No matter how good a driver is, he can't control everything — and he especially can't control the other drivers, the ones who may *not* be so good.

The only conclusion we can reach is that there is no good excuse for not wearing seatbelts — no excuse at all.

make it Click



On impact, the car begins to crush and to slow down.

As the car slows down, the person moves forward until the seat belts restrain him. The belts keep him in his seat and keep his head and chest from striking the car interior.

Being fastened to the framework of the car, belted occupants are able to "ride down" the collision as part of the car. They are able to take advantage of the car's slower stop, as it crushes and absorbs energy. For belted people there is no human collision.

Illustrations courtesy of Transport Canada, Ottawa, Ontario

Championship Cars such as these generally resemble Formula One machines as they both are open-wheeled with huge rear wings and deformable side pontoons that collapse during accidents to help reduce G forces.

In the heat of competition, when every race driver is trying to win, accidents can and do happen. Sometimes something breaks on a vehicle because of the high stresses and causes a mishap. Other times the high speeds develop into situations that are beyond control. Regardless of the reasons, there are a lot more accidents per mile on racing tracks than there are on public highways.

Fortunately, the injury rate among racing drivers isn't magnified by the extremely high speeds. Although there are many factors that contribute to the lower injury rate, the most important is seatbelts.

When compared with 1980 highway driving statistics, race drivers in five professional series were 22 times more likely to have an accident during competition in the first half of 1981 than you or I during everyday driving.

Actual competition, however, represents only a fraction of the time that race drivers spend behind the wheel on race tracks. Most professionals will drive as many miles preparing for a race as actually running it. For example, if a race is slated to run 500 miles, each driver will probably log 500 miles testing before the green flag falls. If the car breaks at this point, the driver will have recorded zero competition miles but still have spent 500 miles behind the wheel at racing speeds.

Including an estimate of testing, practicing and qualifying, racing drivers are still 16 times more likely to have an accident on the race track than the average driver stands of having one on the road.

what's it like out

Race Driver vs. Highway Driver

Accident risk: 22 times greater
Injury risk: 14 times less
The difference: ALWAYS using seatbelts

The comparisons are based on 1980 highway statistics. That year, 1,525 billion miles were driven on American highways and there were 18.1 million accidents. Of these accidents, 45,800 resulted in the deaths of 51,900 people and involved 65,200 vehicles. In addition, two million Americans were disabled in 1.4 million accidents with 2.4 million vehicles.

These figures produced rates of 3.40 deaths and 1,189.89 accidents per 100 million vehicle miles. That's one fatality for every 349 accidents.

For racing, rates based on 100,000 vehicle miles would be more realistic. Therefore, the highway accident rate would be 1.19.

The five professional racing series used here were selected based on their visibility with consideration for the types of vehicles competing. The five series are: the National Association for Stock Car Auto Racing (NASCAR) Grand National tour; Championship or Indianapolis Car races run by both the United States Auto Club (USAC) and Championship Auto Racing Teams (CART); International Motor Sports Association (IMSA) Grand Touring events; Sports Car Club of America (SCCA) Can-Am competition; and, of course, Formula One races counting toward the World Driving Championship.

Statistically the individual series vary almost as much as the vehicles that compete in each. Figures for each of the five series through the end of June 1981 are:

GRAND NATIONAL

Total Miles Covered by All Race Winners	6,557
Winners' Combined Average Speed	116.323 mph
Total Vehicle Miles	396,050
Total Accidents	45
Vehicles Involved	87
Accident Rate Per 100,000 Vehicle Miles	11.36

GRAND TOURING

Total Miles Covered by All Race Winners	5,601
Winner's Combined Average Speed	108.654 mph
Total Vehicle Miles	535,170
Total Accidents	19
Vehicles Involved	28
Accident Rate Per 100,000 Vehicle Miles	3.55

CHAMPIONSHIP OR INDY CARS

Total Miles Covered by All Race Winners	1,355
Winners' Combined Average Speed	135.010 mph
Total Vehicle Miles	97,825
Total Accidents	23
Vehicles Involved	26
Accident Rate Per 100,000 Vehicle Miles	23.51

CAN-AM

Total Miles Covered by All Winners	299
Winners' Combined Average Speed	107.359 mph
Total Vehicle Miles	9,775
Total Accidents	5
Vehicles Involved	5
Accident Rate Per 100,000 Vehicle Miles	51.14

FORMULA ONE

Total Miles Covered by All Winners	1,400
Winners' Combined Average Speed	100.028 mph
Total Vehicle Miles	59,050
Total Accidents	43
Vehicles Involved	66
Accident Rate Per 100,000 Vehicle Miles	72.82

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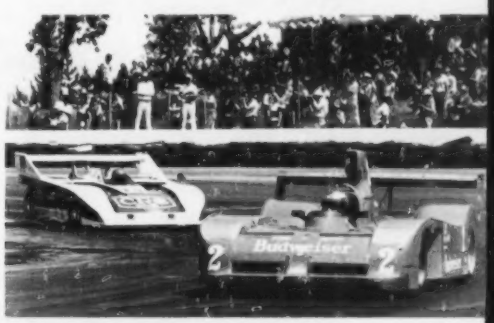
Believe it or not, IMSA Grand Touring machines are supposed to maintain the external shape of a production-based sports car. This is a Ford Mustang with NASCAR-like roll cage and window netting.



Can-Am racers can be called North America's Formula One as the construction is very similar except for firmly fixed bodywork covering the wheels. In addition to the visible roll bar behind the drivers' heads there is another roll bar in front of the driver for additional protection.

there?

(right)
As most Grand National races are run counterclockwise on ovals, there is a substantial tubular steel structure between the driver on the left side of the car and concrete or steel walls on the right side of the track to provide impact protection. There are also bars in both door panels as well as the roof, rear seat area and engine compartment. Note the net in the driver's window to keep the helmeted-head from hitting anything on the left.

The injury list also reflects the type vehicles more than the organizers' attitudes and standards. Again, these are injuries sustained during the first six months of 1981:

NASCAR

- Sprained Wrist
- Concussion, broken right shoulder blade, broken left knee, fractured ribs and bruised right lung.

USAC & CART

- Dislocated right shoulder, minor facial cuts and two cracked ribs.
- Bruised heel.
- Deeply bruised right thigh.
- Abrasions to left hand and lower leg cuts.
- Facial burns
- Burns to six crewmen in fire that caused above facial burns.
- Shattered right leg, six-inch tear in diaphragm, fractured left forearm, compound fractures of left leg.

IMSA

- Broken thumb.
- Driver hit in pit area: two broken arms and a broken leg.

SCCA

None

WORLD DRIVING CHAMPIONSHIP

- Bruised neck and jaw.
- Knocked unconscious for three minutes.
- Mechanic hit and killed in pit area.
- Mechanic hit on starting grid: two broken legs, broken shoulder, concussion and severe cuts and bruises.

The list is even more remarkable considering that nine of the injured and the only fatality were either pedestrians or in a stationary vehicle at the time of the accident or fire.

Of course, first and foremost in any driver's mind is accident-avoidance. Whether the driver is a racer or the next door neighbor on the way to the store, good driving habits and a mechanically-sound vehicle are the best way to avoid accidents.

But when an accident does happen, all drivers want to minmize injuries. There are several ways to be injured in a motor vehicle accident, and by heading off these causes it is possible to survive.

Exceeding the rate of deceleration that the human body can endure is a prime cause for injury. Going hand-in-hand with excessive deceleration are hitting interior parts of the vehicle or having interior parts hit the body as the vehicle is crushed. There are, of course, the after-crash injury causes of suffocation and fire. But if the driver survives the actual forces of the accident, the chances of his being able to deal with the post-crash situations are improved.

Although the authorities vary in their estimates, it is generally accepted that the healthy human body can endure brief instances of G-loads approaching the 25 to 30 G-range under ideal conditions. These ideal conditions include the human being properly restrained and the G-load being in a forward axis. However, no matter how well-restrained the body is, side-to-side G-tolerances are in the two to three G-range. The "seat-of-the-pants" or vertical G tolerance is around 20. (Editor's note: A G* is a force equal to the weight of the body.)

What this means to the everyday street driver is that it may be possible to survive hitting a solid wall at 55 mph. The ideal conditions in this case being: the driver is properly restrained; the car collapses four feet during the impact so the G load is approximately 25 Gs; the driver doesn't hit any other part of the car; the driver is in healthy condition; and the impact is head-on.

If the accident is anything other than head-on, the G load may be reduced because of the greater distance involved in slowing from 55 mph to a stop, but this lower G load will also involve side forces which could easily exceed the two to three Gs the body can survive.

However, no driver, especially a race driver, wants to hit anything head-on. When an accident is inevitable, race drivers look for ways to take the impact with a glancing blow, keeping the side Gs as low as possible. In this way the deceleration is spread over a much greater distance, lowering the G forces to a tolerable level. Highway drivers should keep this in mind, also.

Even with the greater speeds, the race driver is facing basically the same rules. Design criteria in racing vehicles are usually based on a 40-G limit for the driver. (Editor's note: Apparently race car designers feel that the athletic conditioning of race drivers permits them to withstand higher impact forces.) This translates into head-on into a solid barrier at 70 mph with even deceleration in four feet. Or, dealing with theory only, a 200 mph impact with 33 feet of constant deceleration may be survived. If you are wondering how a 12-foot-long car can be decelerated in 33 feet when impacting a barrier, it is easy: the barrier must give and "swallow" the vehicle thereby absorbing the impact. Either that or the impact has to be at an angle, but there again the side G force comes into play.

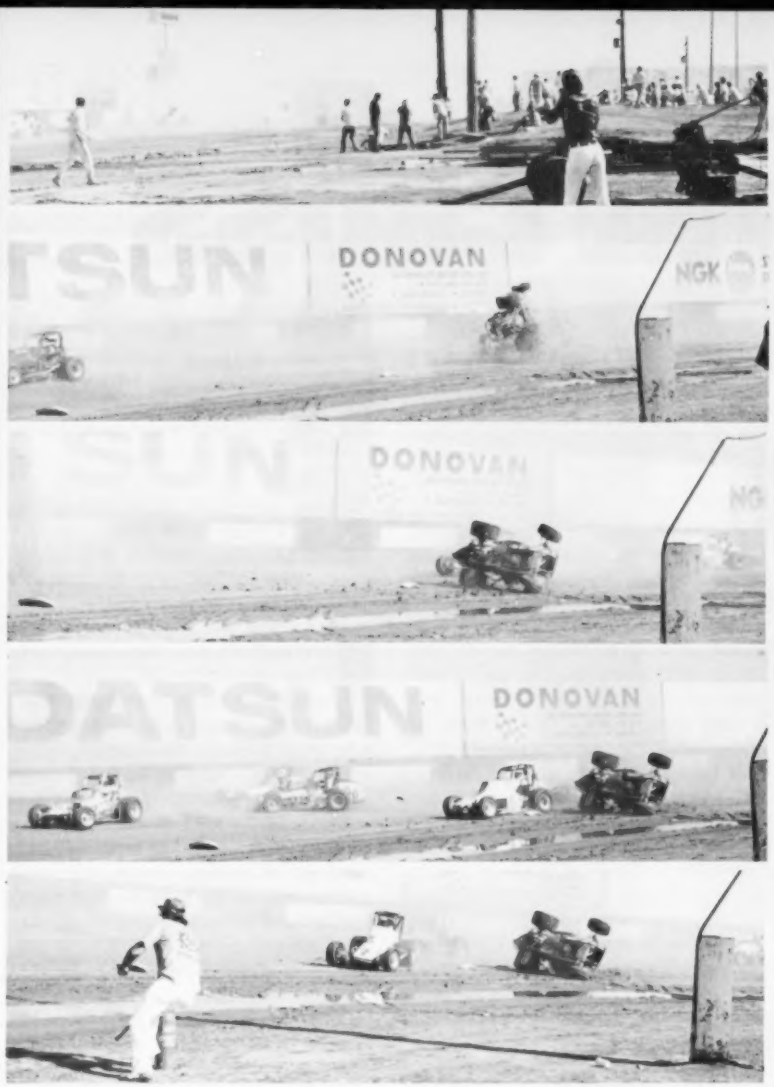
Again, instead of hitting the barrier head-on, the race driver will look for a way to guide the vehicle as gently as possible sideways into the barrier. With this angle of attack the side Gs are kept below the survivable limits and the forward deceleration takes place over several hundred feet, reducing the impact Gs substantially.

What happens if the driver hits part of the car's interior? Instead of decelerating the human body over the four-foot limit at 70 mph, it is decelerated in less than an inch. The G forces then jump from 40 to the 2,000 G range. Certainly the same rules apply should the car collapse in onto the driver.

At one time some race drivers believed as many road drivers do today, that it is better to be thrown free of the vehicle in an accident. However, one look at the deceleration rate the body is going to take when hitting hard ground will explain why this myth can't possibly be true. Again, at 70 mph the ground impact would be in the 2,000 G range, which is not survivable. Even hitting the ground at an angle and rolling probably would be more than any body could survive.

In NASCAR Grand National racers and IMSA Grand Touring cars, there are roll cages constructed around the driver to keep this pilot from hitting parts of the interior and to keep parts of the interior from hitting the occupant. There is also additional frame strengthening throughout the vehicle's construction to provide even deceleration during crashes.

*Deceleration $G = \frac{(.0334)x(mph)^2}{(distance)}$



WIDOW-MAKERS

Sprint cars provide some of the worst accident action of any type of racing in the world. Basically, these machines are the fastest way to go around a 1/2-mile clay track ever designed. But because of this they can also provide the wildest rolling, flipping crashes a person could ever endure. This accident started as the cars exited turn two at the other end of the straight and ended at our photographer's feet (who said going to the races was all fun and games?). Just the rotational inertia alone of a flipping sprint car can approach two Gs. And if it hits the ground during the flip, the impact will shoot to 10-plus Gs for milli-seconds. What's really bad is that under these forces, the neck and spine can be stretched as much as 10 percent with the average person growing up to 3 1/2 inches while the belts stretch an inch or two, also. In other words, the driver can be pulled out of the seat about four inches even if nothing fails. These machines were once called "widow-makers," and the statistics for the first half of 1981's World of Outlaws sprint car races shows why: In 50 programs there were 66 accidents involving 93 cars. That's an accident rate of 240 accidents per 100,000 miles, or more than 200 times the highway rate. The tally through the end of June was: one driver killed (the only driver ever killed in the four years of World of Outlaw competition) and the following injuries to four drivers: cracked knee cap; bruised right eye, nose and mouth cuts; broken arm and facial cuts; and a slight concussion.

The drivers in Champ Car, Can-Am and Formula One race cars aren't as well protected. Their racing machines are of a monocoque construction. That is a single skin or sheet with the suspension, engine, roll bars, etc., attached to it by brackets at various points. This design spreads the loads evenly over the shell. In case of an accident, these loads are also spread evenly over the entire monocoque chassis as it collapses — which is great until the collapsing starts to come in contact with the driver.

An even bigger problem with today's monocoque race cars is that the driver is so far forward in the chassis that his or her feet and legs extend beyond the front of the chassis and are protected only by a thin body shell. As a result, in an accident this body shell is usually torn off the car, exposing the lower portion of the body to direct impacts. Check the list of Indy Car driver injuries and you'll see what happens then.

As for fire problems in race cars, there are basically two systems: one to prevent them and another to put them out. In all the race cars studied, there are flexible bladders filled with blocks of porous foam inside specially constructed fuel tanks. These fuel cells are practically crushproof, leakproof and explosion-proof. To deal with what few fires there are, the racing machines also have automatic, integrated fire extinguisher systems.

As for fires in street cars, they occur in less than one percent of all accidents. And if the driver survives the accident without too many injuries because of the use of belts, then he or she will stand a better chance of getting clear of any fire than if injured in the initial phase of the crash.

The bottom line is still: seatbelts increase accident survivability on the race track and on the highway by a factor of 10 or more. The belts help distribute the high G forces evenly over a maximum body area and prevent undesired body motion in any direction.

Racing drivers know that seatbelts save lives and prevent serious injuries. Do you?

A few short words about handling intersections

at THE CROSS ROADS

Intersections are a necessary evil. They are necessary because it would be too expensive to construct ramps and overpasses wherever streets must cross. They are an "evil" because so many accidents happen there.

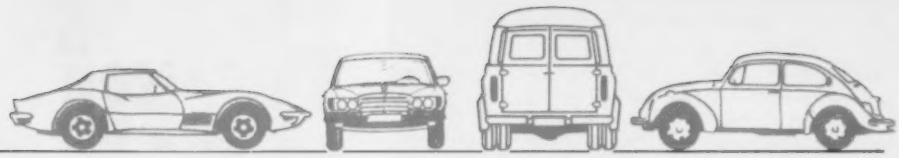
National Safety Council figures for 1977 to 1979 show that nearly 40 percent of all traffic accidents, both urban and rural, happened at intersections. Perhaps intersections are confusing to a lot of drivers, or perhaps too many drivers take chances with cross traffic.

We are presenting here some basics of driving at intersections, along with some pictorial examples of right-of-way and turning situations. We caution that these are rules for driving in the good ol' U.S.A. Members at overseas bases will find the local laws different in many cases. Check with the authorities.

Right-of-way: The right-of-way rules are mostly a matter of common sense. They allow ease of movement with a minimum of hassle. Let's take a few examples.

If two cars on crossing streets approach an intersection with no signs or signals, the first one at the intersection goes through first.

"Mule-Nose, you low-down, no-count, sidewindin' road hawg, this here street corner ain't big enough fer the both of us!"



If they both arrive at the same time, the car on the right moves first. If you have trouble remembering that, think of the expression "RIGHT-of-way." This is the only rule that is more or less arbitrary.

When there are stop signs for both streets, both rules apply — first there, first through, and the one on the right has the right-of-way.

When there is a stop sign for only one of the streets, the person stopping at the sign must wait for anyone who is close enough to be a hazard before he goes into the intersection.

The same rules apply when one is making a turn. If there is a stop sign for one street, the person at the sign must wait until nobody is close enough to be a hazard before turning. If there is a four-way stop, the first one there goes, even if he or she is the one making the turn.

It is always wise to have eye contact with the other driver at an intersection. That way, you know if the other driver sees you and the other driver can move or let you go first, depending on the rules. If anyone gets confused, one of the drivers can gesture to the other and allow him to go first.

However, no matter what the signs say, no matter what the rules say, you do not *take* right-of-way. If you insist on right-of-way at the same time that someone else does, you will have an accident. The overriding rule of driving is "Move only when it is safe to do so."

Red and green lights: Common sense also is the important rule when the intersection is controlled by traffic lights. Most people assume the green light means "go," the yellow light means "caution," and the red light means "stop." That's close, but not quite correct. Red does mean "stop," but the others are a little more complicated.

Here's what they really mean: The green light means "go as soon as it's safe." If you move as soon as the light changes, you might collide with someone who was trying to get through the intersection on the end of the yellow light.

The yellow light means "stop if you can do so safely." Obviously, if the light changes to yellow just as you reach the intersection, you should proceed rather than screeching to a stop. But if you have sufficient space, you should treat a yellow light just like a red one and stop. Police will sometimes ticket motorists for trying to catch the end of a yellow light.

Sometimes drivers will enter the intersection for a left turn and then make the turn after the light has changed to yellow. This is okay if they entered while the light was still green. If they moved into the intersection after the yellow came on, they could be ticketed.

A special situation is when the traffic lights are flashing. Sometimes the lights are malfunctioning, and sometimes they are set that way by the city at an intersection that is sparsely used, for instance at night or at a fairground not currently being used.

A light that is flashing red should be treated like a stop sign — stop, and then proceed when it is safe. A flashing yellow light means slow down for the intersection. A driver facing a flashing yellow light has the right-of-way, but he should slow down and proceed with caution.

An intersection with lights flashing red in all directions, or one where the lights are out, should be treated like an intersection with four-way stop signs.

You turn: When you are planning to make a turn, you must be in the proper lane, so get into that lane before you reach the intersection. As you make the turn, move into the nearest lane of the cross street — the left lane for left turns, and the right lane for right turns — if possible. Turning into other lanes is legal in some places but it does put you in the way of other cars.

Another "must" is signaling. Always signal your intentions when you are turning. Start signaling about 150 feet before the turn and make sure the signal is cancelled after you complete the turn. By the way, always be alert for people who turn without signaling.

At intersections with traffic lights you may decide to make a right turn on the red light. Almost every city in this country allows the right turn on red, although some allow it only where a sign specifically permits it and others allow it anywhere a sign doesn't specifically prohibit it.

The right turn on red maneuver should not be executed like a yield. You must come to a full stop at the intersection before you turn. And you must move only when it is safe to do so.

If U-turns are allowed in your city, watch two things. First, wait until all traffic is out of the way, including through traffic and those turning. Second, make sure you make your turn tight enough to avoid the opposite curb and any parked cars. Not all streets are wide enough to accommodate the turning radius of a large American sedan.

At any intersection, whether you're turning or not, allow the right-of-way to anyone who should have it before you, and to anyone who insists on taking it. Be especially alert for pedestrians, bicyclists and motorcyclists. They also have a right to use the intersection, and they are much more vulnerable than you in your car.

Never speed through intersections. In fact, since they are so dangerous you should always slow a little as you approach them. Even if you can legally go through without

continued

at the crossroads

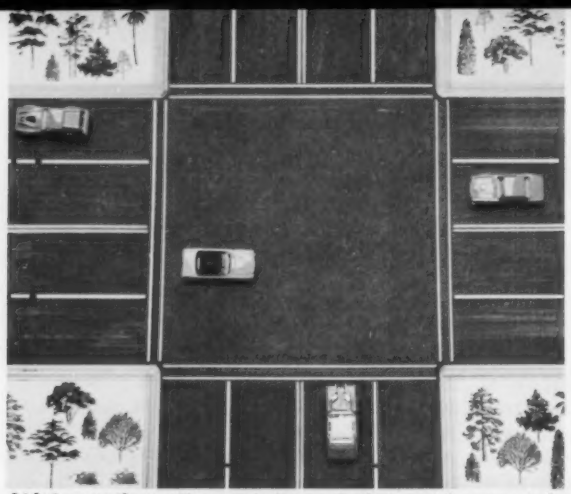
continued

stopping, on a green light or on a street with no stop sign, someone else might decide to run the light or stop sign. Or the green light could change to yellow sooner than you expected. Or a pedestrian could dart in front of you.

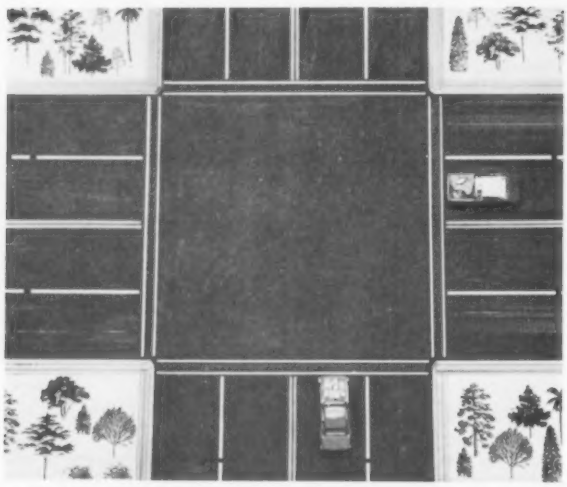
As you near the intersection, ease your foot back on the gas pedal a little and be ready to go for the brake if you need to.

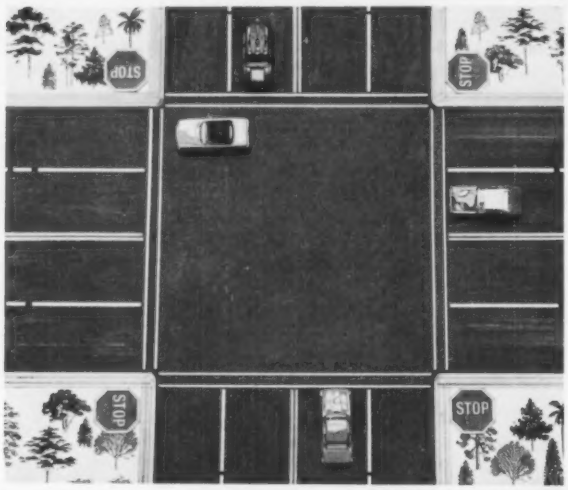
Treat intersections with respect and always expect that something hazardous will happen there. Something might.

RIGHT-OF-WAY RULES

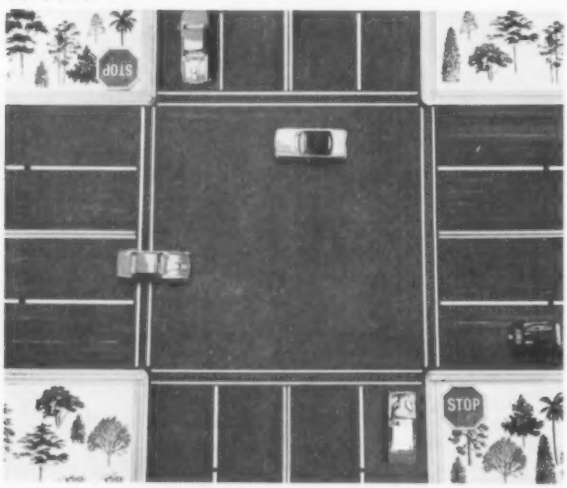


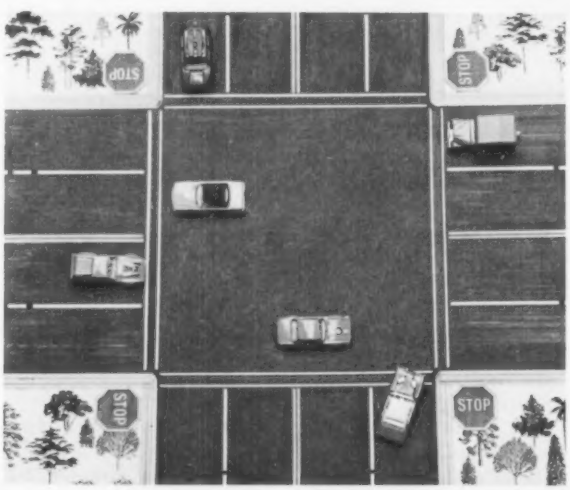
At intersections with no control signs, the first car at the corner is the one which goes first. Drivers must yield to cars already in the intersection.





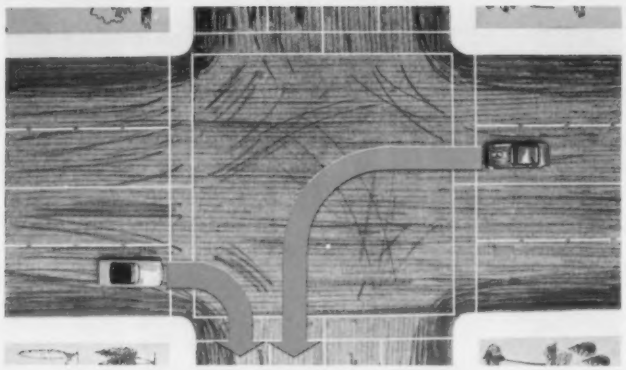
(left) If two cars on cross streets come to an uncontrolled intersection at the same time, the car to the right is the one which may go first. **(right) At four-way-stop** intersections, the same two rules apply — the first car at the intersection goes first, and the one to the right moves if two arrive at the same time.

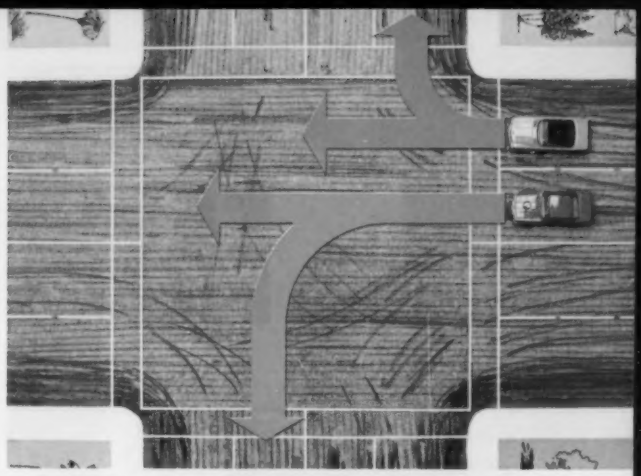




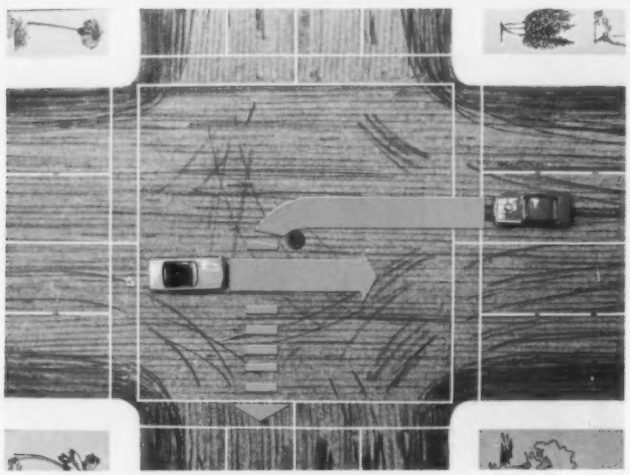
(left) If only one street of the intersection has a stop sign, the motorists at that stop must wait for any cars that are close enough to present a hazard before they move. **(right) Likewise,** any driver who is making a turn must wait for traffic to clear before he attempts the turn.

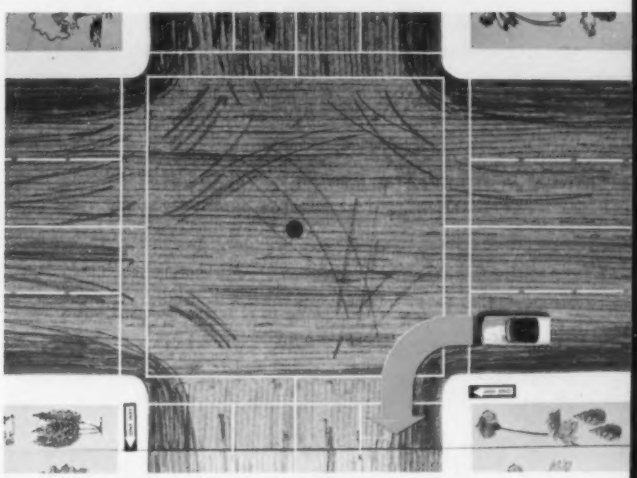
TURNING



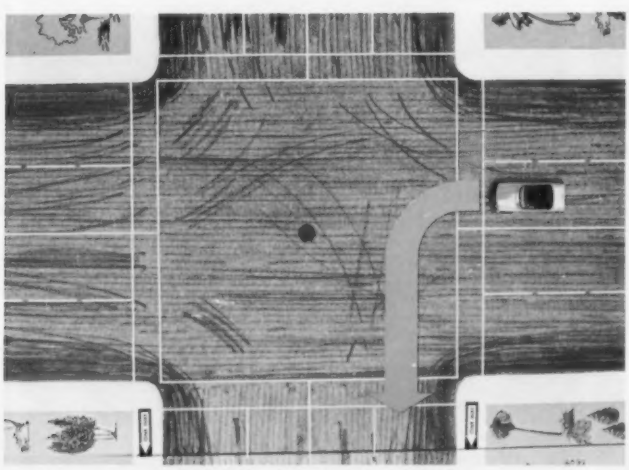


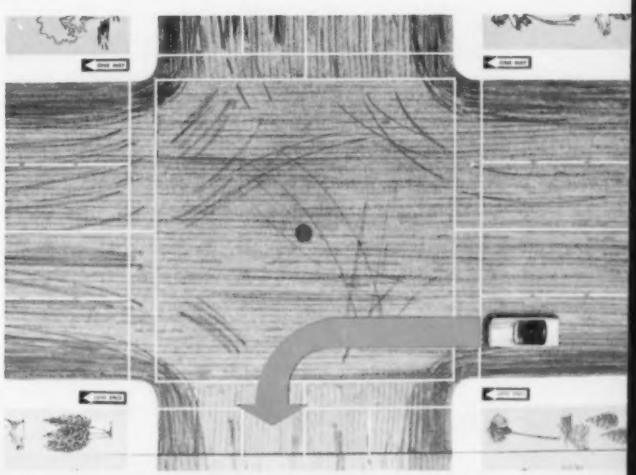
(left) When you're making a left turn and the opposing car is making a right, be sure to get into the left lane. **(right) There are several ways** to go at any intersection. When you turn, go into the near lane.





(left) Wait for the car in the intersection to go through before you do your left turn. Motorcyclists in the intersection are often hit by left-turning cars. **(right) Turning from** a one-way street onto another one-way street, once again get into the near lane. Some cities allow a left turn on a red light in this situation, but be sure it's legal (and also safe) before you do it.





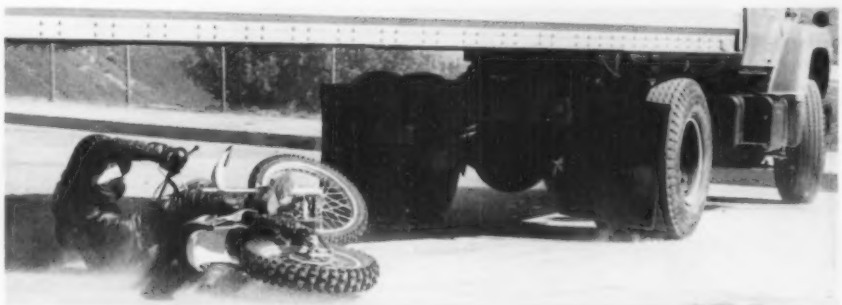
(left) From a two-way onto a one-way, turn into the left-hand lane. **(right) And the opposite** situation, from a one-way onto a two-way.

SPECIAL ISSUE

FALL PREVIEW

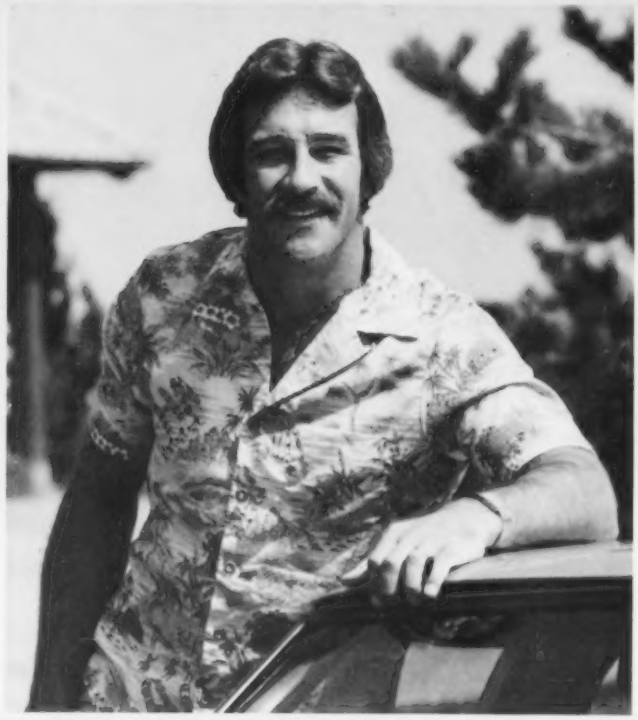
SEDD TV GUIDE

The major causes of automobile accidents are well-represented on your home television screen. They even form the main theme for many shows. But on SEDD-TV, where motor vehicles is the only theme, there will be enough improper driving and driving errors in the new fall schedule to put a ground safety office on overtime. Check out the new programs in SEDD-TV's fall program to see what accident causes you can find.



CHaPs

Stick and Ski are two bantering, bickering buddies who really like to chase cars as if they were motorcycle patrol officers. The trouble is they are always forgetting the two-second rule and end up going "over the top" or "submarining" their subject vehicle.



MAGNATE, P.I.

You might think it's easy being T.I. (Turn Indicator) Magnate, Private Investigator. Well, it isn't. Sure, he gets to drive a borrowed exotic car fast all around scenic Hawaii. But therein lies the catch — being a typical private eye, Magnate refuses to yield. On a case, in a fight, at intersections, while riding a bike, as a pedestrian — no matter what, Magnate just won't yield.

KOOKS OF HAZARD DRIVE

When something happens on Hazard Drive it always happens at the end opposite where the Kook cousins, Duke, Lou and Iris are. So they spin their wheels, pull a bootlegger turn and speed recklessly to the action.

LANE TO LANE

Lois and Clark Lane, having made their fortune selling movie rights to their life stories, now spend their time driving around looking for excitement. And they find all the excitement they can handle by changing lanes without giving any warning, passing in no-passing zones, turning where they shouldn't, and just generally driving on the wrong side of the centerline.

An AVOIDABLE TRAGEDY

Death and mishap reports come across my desk every day — too many of them. They are only general outlines of the accidents involving Air Force people, but they give me some idea of what is causing our problems. Therefore I read them all. When the reasons for these accidents are discovered, it is my duty to let you all know. Maybe the knowledge will help you avoid similar accidents.

Once in a while I feel one of these reports deserves special attention. This one involved disregard of an order that might have prevented an accident and the non-use of a simple safety device that might have prevented the death of one of our people.

A technical sergeant and a staff sergeant were transporting a piece of road-working equipment by tractor-trailer from an Air Force base to an off-base recreational area to prepare the campground for summer use. The trip was a long one, and they had to make a stop for fuel on the way. At the stop they discovered they had a flat tire on the trailer. They told the service attendant to repair the tire, and they went off to have a drink (alcohol). We don't know how much they drank, but the autopsy on the driver showed a blood alcohol level of .17, much above the legal level of intoxication. Also, there were nine unopened cans of beer and two empties in the cab after the accident.

All members involved in this project had been given written orders that they were not to drink alcohol at any time during this deployment.

When the tire was repaired, the two NCOs drove away. About four miles outside the town, the driver saw an oncoming vehicle crowding the centerline of the highway. He drove his tractor-trailer toward the right edge of the road to give the other vehicle room. The road had a narrow shoulder, only a foot and a half wide, that turned out to be very soft. Beyond this was a ditch.

The driver moved too far to the right, and his tractor-trailer left the paved surface and went onto the shoulder and into the ditch. He drove about 400 feet as the ditch got deeper and then the entire rig overturned, coming to rest on its top.

Now here's the part that causes me the most pain. The driver did not wear his seatbelt, and he died of massive head and chest injuries. The passenger was buckled in, and he suffered only minor injuries and was able to go for help.

Despite the alcohol and despite the accident that Air Force sergeant might still be with us if he had worn his seatbelt. The vehicle involved in this accident will be repaired, our sergeant will not.

Please don't drink when you are going to be driving. And please remember to fasten your seatbelt. Your Air Force needs you.

LELAND K. LUKENS
Brigadier General, USAF
Director of Aerospace Safety

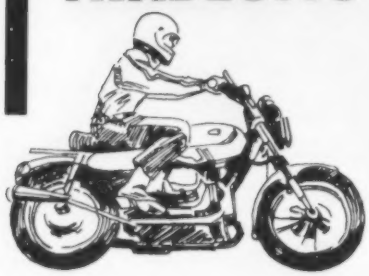
REALLY TIRED?

Fatigue is a major problem in expressway driving because of the monotony. One of the best ways to avoid this problem is to keep your eyes moving, of course. And you might be surprised by some of the things you see. But don't let them distract you.

A distraction such as this can capture your attention and at expressway speeds before you know it:

- You're in the wrong lane;
- Your hood is part of the trunk of the car in front of you;
- You're scraping along a guard-rail;
- Your wheels are off the road;
- Other drivers are attempting maneuvers that qualify as "near misses" to avoid hitting you; and/or
- Your speed has crept up or dropped off to a dangerous level.

night riding TRADEOFFS



While riding a motorcycle or driving a car, if you look directly into those oncoming headlights it will take a full second for your eyes to respond to the increased light. And gradually over the next seven seconds — more or less — you'll recover your night vision.

There's probably no better time for motorcycling. It's always cool and the traffic is usually light. The smells seem more pure and fresh. Even the engine seems to run better — well, at least it *sounds* like it is running better. It also provides just enough warmth.

You can tell all kinds of things about the countryside around you that you would normally miss during the day just because of the feelings, smells and sounds at night. For example, the air turns suddenly cold. It is damp, but smells fresh. So you know you are near a large body of water such as a lake or river. The continual splat of bugs on the windscreen confirms this.

That's what makes night riding great. There just aren't as many distractions. No real traffic to worry about. No ugly signs of human progress because the darkness hides them.

But, because the darkness hides all these signs, the little clues that help judge distance and speed are also missing.

Distance-judging vision involves three eye functions. The first is two eyes working in unison. The second is moving "parallax," where moving the head from side to side makes distant objects appear stationary while close objects seem to move. The final function for judging distance is comparing relative sizes. Without being able to see roadside clutter, there is nothing to compare sizes with.

Another big night vision problem is that lights, especially red lights, appear to be farther away than they really are.

And, of course, without the visual clues it is harder to judge speed. That's why you should pay extra attention to the instrument marked in mph/kph — the speedometer.

Yet another *light* problem occurs when meeting that occasional vehicle going in the opposite direction. There are times when you notice how light-sensitive your eyes are, but seldom do you realize how really long it takes to recover from such encounters. You become aware of your eyes' light sensitivity when you're popped in the eyes by a photo flash, or when you rush headlong from bright sunlight into a dark tunnel. You go temporarily blind.

The same thing happens when you stare into oncoming lights at night: temporary blindness.

When looking directly into oncoming headlights it takes a full second for the pupil to respond to the increased light. In that second, light-sensitive photochemicals are drained from the eye. Once the headlights have passed, the chemical process reverses and the light-seeking chemistry slowly is restored in the retina. But this gradual regeneration takes an average of seven seconds. Of course this time can be more or less than seven seconds depending on how bright the oncoming headlights are and how long you looked into them, and also how old you are.

But it's still an average of *seven seconds!* Count them: One-thousand-one, one-thousand-two, one-thousand-three, one-thousand-four, one-thousand-five, one-thousand-six, one-thousand-seven. That's a long time to be without vision.

It helps, of course, if you don't stare directly into the lights in the first place. Try focusing just to the side of the lights or following the edge of the road with your eyes, instead.

One minute after the intense light stops, the eye's sensitivity to a low light level increases tenfold. And in 20 minutes this sensitivity increases 6,000 times.

With that in mind, take a hint from two children standing in line to see a movie on a sunny afternoon. The little girl is holding her younger brother's hand. His eyes are closed. When asked why her brother has his eyes closed, she replies that "it is dark in the theater and I can't see when I first get in. So, when we get in, he opens his eyes and finds us good seats."

If you're going to be riding after sunset, seek a darker environment to allow your eyes to adapt before swinging onto the saddle. And while it may look odd (or "cool," if you

One second after the headlights have passed you've covered 81 feet at 55 mph, but you are probably six seconds away from the gradual recovery of your night vision.

Second number two, after 81 feet and slightly better vision, but still not enough to see any real hazards.

After three seconds you've covered 243 feet at 55 mph and are still probably four seconds away from regenerating your eyes' light-seeking chemistry.

hang out with *that* crowd), wear sunglasses when you stop for a rest break at a brightly-lit service station, rest area, coffee shop or restaurant. This minimizes the amount of adjusting your eyes will have to do when back on the road.

Another important tip that helps with night vision is scanning. Moving your eyes from side-to-side brings larger areas into clear focus, bringing out details that may have been hidden in the eye's blind spot. Peripheral vision only detects motion and the faster you go the narrower the peripheral vision becomes. Therefore, scanning to get as many details as possible clear enough for inspection is doubly important at night when things are semi-hidden in the dark.

Please don't dent a six-pack, toast the host with the grape or have one for the road before night riding. Beer, wine, spirits, cocktails, mixed-drinks . . . any drink (or, for that matter, the jellied-scotch sandwich invented by DRIVER's technical editor) containing alcohol can combine with fatigue, lighting changes and bad glare to cause great pain in your life — if not terminate your existence.

As you should already know, alcohol:

- Slows reaction time,
- Diminishes coordination, and
- Contributes to overconfidence.

Alcohol also relaxes eye muscles, slowing their responses. This means that you take longer to focus and even have trouble holding your eyes on an object so that you can focus on it. Without being able to control your eyes, you are going to start getting inconsistent visual signals, experience double-vision, lose your balance and lack depth perception.

If there is a more dangerous prescription for motorcycling, you'll have to tell me about it.

There's another no-no for night riding: smoking. Yup, you should cut out the smokes if you intend to ride at night. Ingesting all that carbon monoxide and nicotine interferes with the delivery of oxygen. And the eye photochemistry needs oxygen. Without it, the chemical reaction

continued

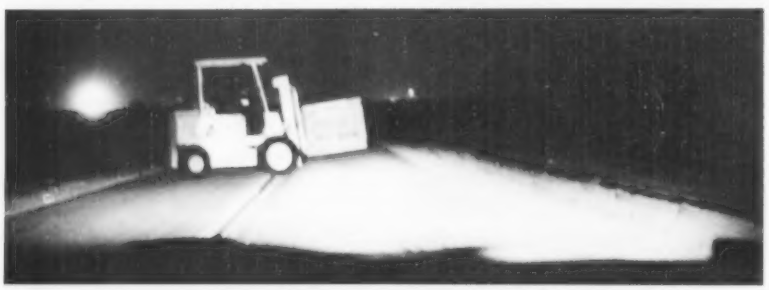
(left)
It's been four seconds since the headlights passed, you've covered 324 feet, and at 55 mph you'll likely cover another 243 feet before you can see as well as you did before looking into lights.

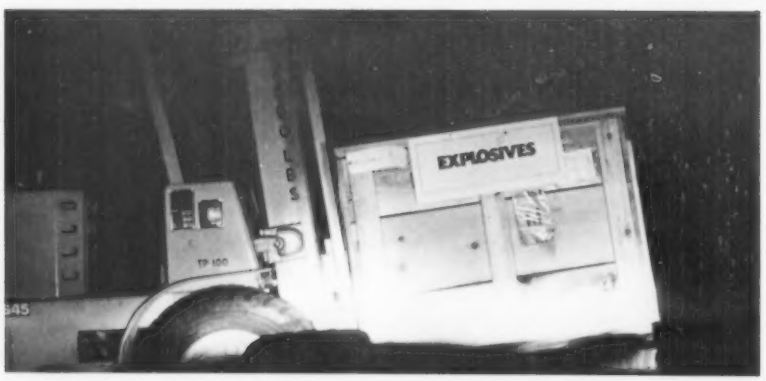
night-riding tradeoffs

continued

In the next second you've got to see the hazard, make up your mind to stop, and hit that brake pedal. On the average it will take from 0.15 to 0.85 seconds to make the decision and 0.30 seconds to react.

On the average, you're still a second away from fully-recovered night vision but if you aren't already on the brakes, it's probably too late — there's only 162 feet between you and the hazard. Depending on your car's brakes, tires and road surface conditions it can take you anywhere from 101 to 290 feet to stop at 55 mph.





takes longer, making recovery from glare a slower process.

Most of you, whether you admit it or not, are not really night people. You may want to stay up late. You may like to keep wee hours. But your body objects. It objects in the form of fatigue. If you ride when you are tired, you'll find that you unconsciously focus just a few feet in front of the bike — not even far enough to avoid a rock at a foot-powered pace.

The best way to fight off fatigue is to get plenty of rest *before* setting out on a night ride. What's a nap after supper going to hurt?

On the trip, take plenty of rest breaks. And don't just pull over and balance on the seat for a few minutes. Get off the machine and move around. You're supposed to be in good shape; prove it. Do a few exercises.

Coffee shops and restaurants are favorite stops because all that coffee you gulp down will require a restroom stop within the next 50 to 100 miles — guaranteed.

Now for the *dark* side of night riding. For some reason, civilization as we know it seems to disappear when the sun sinks in the west. And out into the dark roll all the drunks, weirdos, creeps and other forms of lowlife.

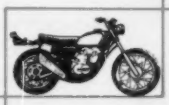
Because drunks are every driver's and rider's biggest threat, be very cautious of any vehicle moving erratically. Always keep an escape route in mind.

To avoid the other, less desirable forms of nightlife, stick to major highways, especially when traveling through large cities. Take breaks only at large rest areas, restaurants and truck stops. Park in well-lighted areas. If someone starts pacing you in an adjacent lane, make sure it isn't the fuzz, then split the scene. And by all means, check out your stop before getting off your bike. If there is anything suspicious or that makes you uneasy, just keep on biking.

Biking at night has its tradeoffs. But it has its rewards, too.

(above left)
Seven seconds after the headlights have passed you may or may not have regained your night vision depending on several variables. If you got on the brakes in time, you're 81 feet and as much as three seconds from the hazard.

(left)
Were you on the brakes in time to keep from hitting this hazard that has been within headlight range since the oncoming lights passed? You'd better hope so!



too CLOSE FOR COMFORT

While performing a cross-country run on a motorcycle accompanied by one other biker, I experienced the most frightening event in my life. My fellow biker insisted on driving at 55 mph on the nose and driving for approximately 16 hours per day. Myself an experienced roadrider, I didn't particularly care for these long hours on the road. Experience had taught me that if you pace an 18-wheeler about half a mile behind, you can make superb time and not have to worry about Smokey. Using this method I could cover the same distance in eight hours that I was now covering with my fellow biker. I swallowed my experience and kept pace with the other biker.

After two days of boring, uneventful, unenjoyable touring, I asked my fellow biker to pick it up, and he said no. I said I was going to lone it and would meet him at our destination. The next 100 miles were uneventful but extremely enjoyable. The 18-wheeler I latched onto was making superb time.

As I was in the process of passing another 18-wheeler, I entered severe weather consisting of rain, wind, and light hail. I backed off on my speed as the weather worsened. This proved to be an almost fatal action. The 18-wheeler I was passing caught up with me and deluged me with spraying water, which cut down severely on my visibility. I continued backing off on my speed but the suction from the 18-wheeler pulled me to the right. Concerning myself with breaking smoothly away from the 18-wheeler, I failed to notice the road had made a sharp right turn.

I had no time to think the situation over. It was either turn or go off the road (nothing less than a 100-foot drop, straight down). I laid my bike down hard to the right and moved my body hard left. I decided if I was going to go over the cliff I didn't want the bike accompanying me. My position in the road was so close to the steel railing that I could have reached out and touched it. How I don't know, but I had made the curve. The rain was pouring down by now and my only concern was to get on level ground again. I proceeded at a very slow speed, my nerves twitching a bit, until I was clear of the bad weather.

At the first exit I stopped for a meal and some breath-catching. I looked up and the other biker I was with pulled up and said, "See, riding by yourself isn't much fun is it?" I really had no reply. The moral of this story I don't have. I'm just glad to be alive to tell it!

We shouldn't be speeding, drafting semi's and mixing it up in the rain. But for pure luck this rider would have been one more fatal statistic. I guess the moral is "experience is the best teacher." You've had one more experience to put in your computer to calculate and analyze. It will probably affect the way you ride in the future and may affect your longevity and that of other bikers. Thanks for sharing!

LELAND K. LUKENS
Brigadier General, USAF
Director of Aerospace Safety

YELL when you find it

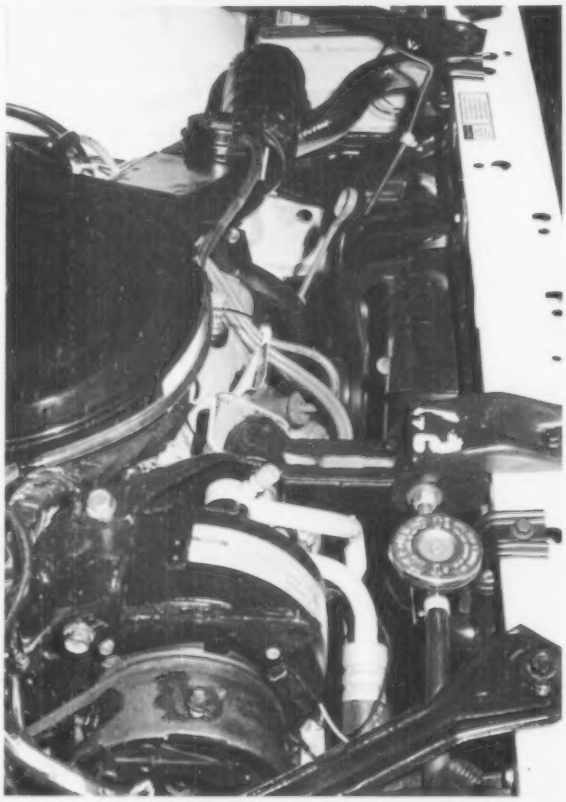
DRIVER's technical editor came to work Monday with more than the usual number of bandages on his hands. There's nothing unusual about this, except the wounds came from working on his car, not playing with his dogs. Actually, "working on his car" is misleading; all he did was check the oil level.

This may seem odd, especially when considering how many cars the technical editor has owned, but there is a lesson at hand.

On today's small front-wheel-drive cars, all the components that make the vehicle move are crammed into the front with the engine. This makes for a very crowded engine compartment and finding the oil dipstick is only half the challenge. The other half is to reach it without cutting fingers and burning flesh.

Additionally because these small engines are highly stressed they generate lots of heat which makes many parts, including the oil dipstick, a little too hot to handle. As a result many people have gone to using two rags for checking the oil level. One for the traditional wipe off of the stick, the other as insulation against the stick's heat.

The oil dipstick on General Motors' J-cars (Cavalier, J-2000 and Cimarron) is easy to spot and reach. Not only is it painted a different color from the rest of the engine components, it is right behind the radiator cap. See it?



GM's six-cylinder X-cars (Citation, Phoenix, Skylark and Omega) have easy-to-locate oil dipsticks. They are painted a contrasting color and point forward just above a front brace.

Although it is a different color than most other engine parts, the oil dipstick of four-cylinder GM X-cars (Citation, Phoenix, Skylark and Omega) hides among much of the engine plumbing.

Escort/Lynx oil dipsticks are a different color than other engine parts and located out in the open; however, the unusual placement will keep you searching for a couple of moments.

Heat shields, air cleaner horns and other plumbing make finding the Omni/Horizon oil dipstick a challenge.

Therein lies another danger. Almost all these cars have electric fans. These fans save engine power by running only when needed. However, "when needed" can include while the engine is off. Most of these electric fans will run even when there is no key in the ignition switch and are very capable of pulling rags and the fingers holding the rags into their blades. And since everything is very close and tight in the engine compartment, the fan can attack bare arms as well as searching fingers.

The solutions to these problems are more common sense than anything else.

- Visually locate the dipstick.
- Visually establish the path you can use to reach it, making doubly sure that there are no obstacles that have been overlooked.

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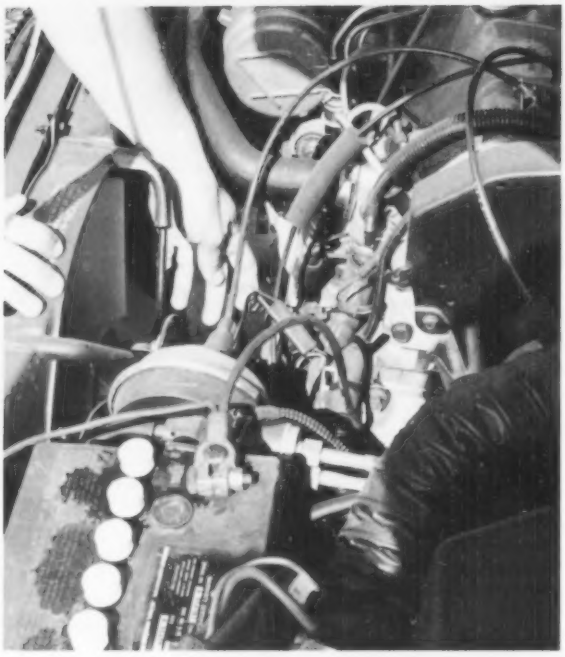
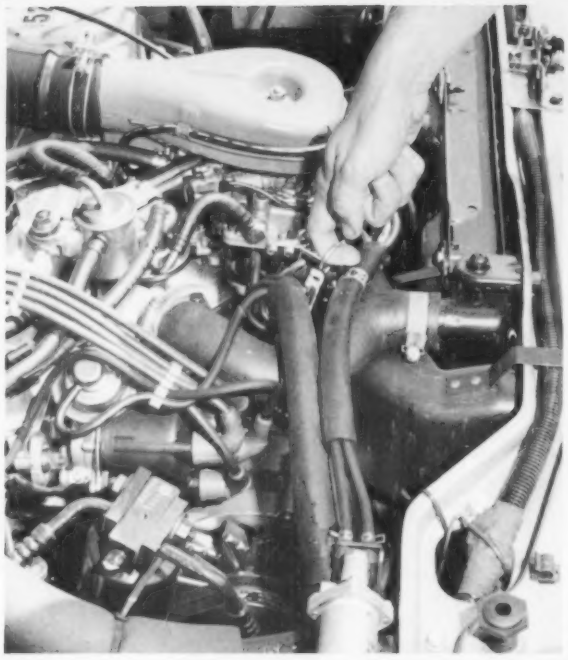
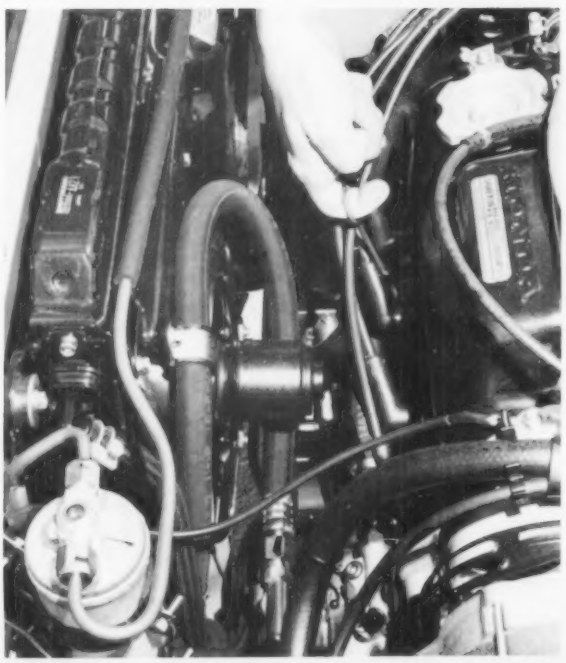




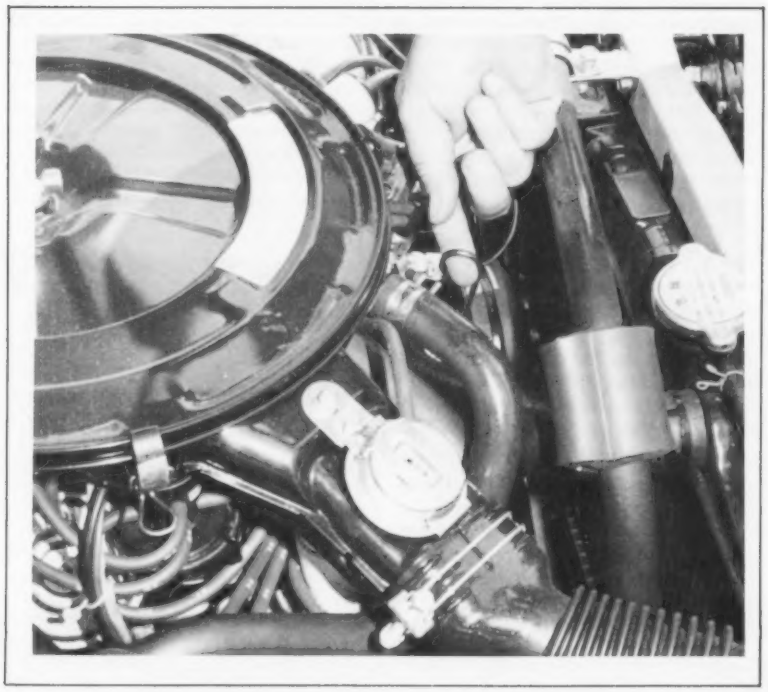
There are two engines for Chrysler's K-cars (Reliant and Aries) and on both the engineers have done an excellent job of hiding the oil dipsticks.



Finding the Honda Civic oil dipstick is not as hard as it looks (left), but there is much more room for looking in Honda's Accord (right).

Not only did Mazda bury the oil dipstick in the GLC, they put it against the radiator and trapped it below a front-opening hood.

The four-wheel-drive Subaru engine must share its compartment with everything including the spare tire.



- Be aware that the fan can turn on at any time.
- Carefully approach the dipstick.
- If your hand or arm touches anything along the path, stop and find out what it is before getting in too deep.
- Be extra careful if something is warm to the touch. It could get hotter with prolonged contact.
- Lightly touch the dipstick to see how hot it is before hooking in your finger and pulling it out.

continued

Colt/Champ owners develop great sleight-of-hand movements to get to oil dipsticks, or else.

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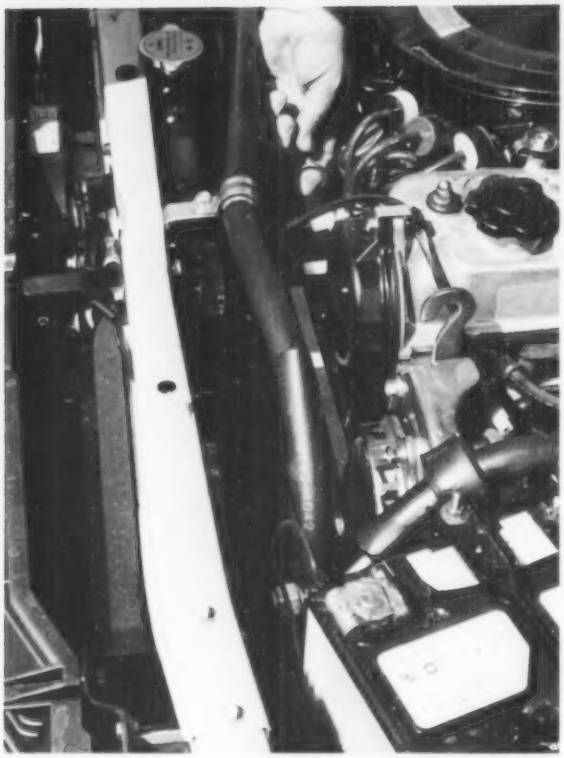
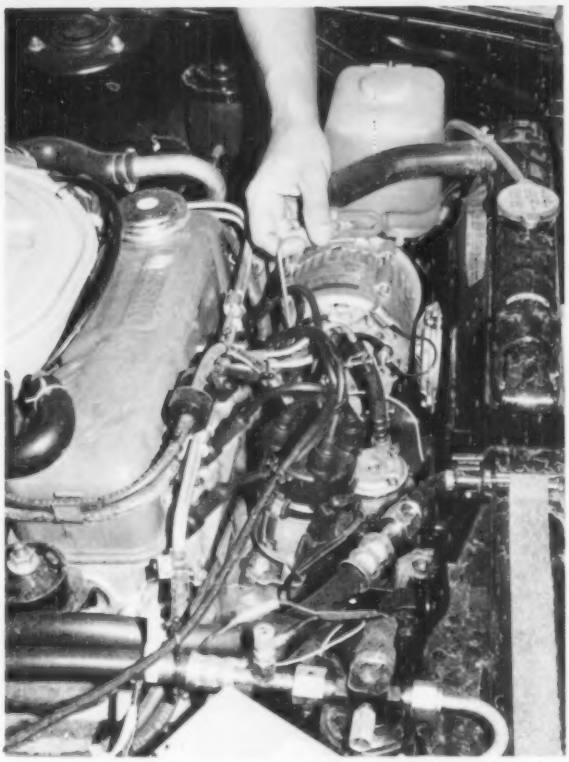


That air conditioning hose isn't as hard to get around to reach the Toyota Tercel dipstick as it looks.



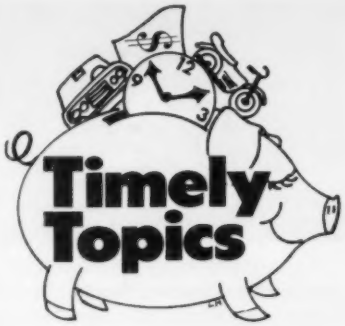
Datsun put the oil dipstick on the 310 in among numerous wires.

■ Be careful that any rags or loose clothing are kept clear of the electric fan. It can turn on without warning.

■ Be careful not to plunge the stick back in. Just because you made the first *slow* trip safely is no guarantee that there is a fast route to the end of the job.

Of course, you could avoid the heat problems by checking the oil level when the engine is cold. For example, you could check the oil level first thing every morning. And as long as you are under the hood, check the coolant level. It won't take too much longer to check the transmission fluid, the power steering reservoir, brake fluid level and battery, also. Mornings are also good times for checking tire pressures. And as long as you are going to have to walk all the way around the car, check all the lights and clean off the lenses, too.

Or you can continue to just dive in and yell when you find the hot dipstick . . . or yell when the tender underside of your arm finds a hot radiator hose . . . or yell when the back of your hand rips along a sharp edge . . . or yell when. . . .



HIGH-MOUNTED BRAKE LIGHT

The rate of rear-end collisions can be reduced if cars are equipped with a single, centered, high-mounted brake light, according to a recent study of New York City taxicabs. The study measured the rear-end collision rates of 900 modified and unmodified cabs during a 10-month period. During the time that cabs covered a total of 37 million miles, those that were modified with a brake light mounted on the trunk, centered at the bottom of the rear window and illuminated by one bulb, had 44 percent fewer rear-end collisions than the unmodified cabs. Those modified cabs that had a larger brake light illuminated by two bulbs had an even better record — 58 percent fewer accidents. The overall reduction for both modified groups was 51 percent. According to the Insurance Institute for Highway Safety (IIHS) which sponsored the study, the results provide support for a proposed amendment to Federal Motor Vehicle Safety Standard No. 108 which would require single, centered, high-mounted brake lights. The devices would cost about $5 as original equipment. *(Traffic Safety)*

FALSE ADVERTISING CLAIMED IN GAS-SAVER DEVICE SALES

The Federal Trade Commission has charged a mail-order company with selling 100,000 automotive devices by falsely claiming they would cut gasoline bills up to 20 percent.

An FTC attorney said the false advertising charges may be a prelude to a second case to get back money for consumers who paid $12.95 to Cliffdale Associates Inc. for the Ball-Matic valve. This could bring up to $1.295 million in refunds to consumers.

In a companion case, the FTC announced an agreement with Ball-Matic Corp., manufacturer of the valve, to stop claiming that it will lead to significant improvement in fuel economy.

The valve injects air into the car's carburetor leading to "more effective combustion and a fuel saving of up to 20 percent," according to ads that appeared in major newspapers and magazines.

Cliffdale already is the subject of a 1979 consent agreement with the Postal Service to discontinue the claims and is no longer selling the valve through the mail according to the Postal Service.

SO LONG TO THE THREE-YEAR CAR LOAN

Automobile financing, for the more expensive models, has moved out to 60 months. Some 95% of all other car loans are 48 months. Just a few years ago, two-year and three-year auto loans were commonplace. Now, they're the exception.

With "sticker shock" scaring away potential customers, auto dealers and lenders have to provide more and more "months to pay" in order to keep payments within reach, according to automotive writer Peter Weaver.

"Who knows," says one East Coast dealer, "you may have auto loans like mortgages some day." Banks are already talking about "variable rate" auto loans, like the new, variable rate mortgages for homes. If these come to pass, it would mean that you might start out with a 16% loan and have it bumped up to 19% or 20%, depending on what interest rates do. You'd either have to pay more on your monthly payments or make the loan run longer.

In many areas around the country, banks are pulling back from auto loans. They're finding that their money works better with higher-priced business loans.

This pullback by the banks means the burden of financing is falling primarily on the auto manufacturers' credit companies such as General Motors Acceptance Corporation, Ford Credit and Chrysler Credit.

And these credit companies are getting a little more stingy with their money. For example, auto dealerships that take on foreign cars in the future will be able to get financing for their American models, but not the foreign ones.

Financing for foreign-made cars could become tight. Word has it that Chrysler has agreed to take on the financing burden for Volkswagen but other foreigners will have to form their own money-lending organizations or come up short of funds.

The best rates for automobile loans around the country can be found at credit unions.

HOW IT HAPPENS!

A senior airman is a passenger in his own car, sleeping in the back seat as a friend drives them home after an evening in a neighboring town. The driver is tired and he runs a stop light. A truck, turning right at the intersection, tries to avoid the car but is sideswiped anyway. The senior airman is thrown into the front seat by the impact and suffers fatal injuries. The driver, held in by a seatbelt and shoulder harness, is only slightly injured.

How many mistakes can you see in this incident?

1. Leaving for home late.
2. Allowing a tired driver to pilot the car.
3. Passenger not wearing his seatbelt.
4. Running a stop light.
5. Failure to avoid the truck.

BACKfire
LETTERS to the EDITOR

MINIMAL DISCOMFORT

I read with sympathetic interest the story of SSgt Ted LaColle (June '81 DRIVER) and the account of his accident in which he escaped head injury while wearing a helmet.

I was fortunate in that I was wearing a full-face helmet when I had a high-speed (50 to 55 mph) crash after a deer darted into my path. Many riders complain that the full face helmet is confining and often uncomfortable due to heat and lack of ventilation. I am sure that SSgt LaColle, myself and others who have suffered accidents while wearing a full-face helmet agree that the minimal discomfort is well worth the protection. It saved my life.

Cpt Greg Guillie, USA
Alva, OK 73717

BYM UNIFORM

Ron Lathrop's case report on the ruin-it-yourselfers was terrific (May '81). Recommend he be allowed to work in the following disguise: bell-bottom jeans, white socks, boots, a Winnie-the-Pooh T-shirt, Porsche baseball cap, and oh, yes! A large coffee thermos.

Thanks, Ron, for a great piece of investigative work.

2Lt David O. Block, USAF
Carswell AFB, TX 76127

The Tech Ed just happens to own the very costume you describe. Watch for it in future chapters of "The Backyard Mechanic"!

HAVE YOU EVER MET A MOTORCYCLIST YOU LIKED?

Don't you just hate those cyclists? They act like they own the road without giving us car drivers a thought. Most of them don't have the sense they supposedly were born with. Riding without helmets, wearing only sandals and shorts, not to mention having little kids either riding in front or behind them. But you haven't even scratched the surface. What about mopeds? They look like they are riding a horse — side-saddle. Usually they ride next to the curb but come to a light and they move ahead of us — who made them so privileged? Now I know what the expression "seeing red" means — it happens every time I see a motorcyclist. I can't even tell the difference between the turkeys and the safe, sane cyclist.

What is it about motorcyclists that causes us car drivers to get so angry and upset? I've tried to figure it out and I come up with not much of anything — they rank right above an irritant, like a mosquito. I've had a few instances where an accident could have occurred because of a cyclist being careless but that's happened with car drivers too and I don't instantly hate them on sight.

Maybe the "whys" aren't as important as the figuring out what to do when I "see red." I've matured enough to have figured out that when I'm letting my impatience or anger interfere with life I just take a few deep breaths and relax. Seems much more difficult though when I'm behind the wheel, late for work, and see a cyclist weaving in and out of traffic. Then I see it as my "mission" to make sure he doesn't "pull that trick" on me. Then I set myself up to cause a chain reaction where I make the cyclist "see red" too, and pretty soon everyone on the freeway is a potential accident victim because of me and my dislike of cyclists. Not sure I'd like to have to live with the memory of having caused injuries to others or myself. Doubt that any of you would like that either.

So here I am being rational sitting at my desk. Why can't I carry all of this over to my sitting behind the wheel? No answer except "I CAN." I can make a decision right now that I will take three deep breaths when I see a cyclist and give him/her the benefit of the doubt instead of instant dislike. I can make sure the "seeing red" only occurs at a stop sign. Think I'll have an easier time driving if I do this . . . plus I can avoid the worry about being the "cause" of a traffic mishap. A mishap that could involve people's bodies and lives. Not a bad feeling — like being mature and in control.

A.A. Stiff
Norton AFB, CA 92409

Notice this letter comes from California, where lane-splitting or "riding the dashes" is considered legal and no cause for traffic ticket ***unless*** *the motorcyclist is in an accident. It takes a really mature driver to sit idling in heavy traffic, smiling and waving at the passing motorcyclists as they tunnel between the stopped cars. Well, you don't have to smile but, as Stiff says, you do have to be rational about it. Being "rational" does not include throwing aluminum cans at the cyclist's departing backside!*

SAFE BATTERY CHECK

We here at Clear Air Force Station Power Plant enjoy DRIVER very much and find it very helpful and educational.

I did, however, find something in the June issue that disturbed me. It was a picture in the "Backyard Mechanic" of a man with his face about six to eight inches above a battery checking it. This is very bad as batteries bubble for a long time after shut down of an engine. The bubbles burst and splatter which would cause severe eye damage. You can see these splatters of electrolyte by removing a cap and waiting a few moments and then you'll see the splatters on top of the battery around the hole. Either wear goggles to check it or open the cap and wait 15 to 20 minutes, then check — but keep your face at least one foot or better

away from the battery. The bursting bubbles should not splatter higher than 12 inches — "should not" but don't chance your eyesight to that.

Due to the severe weather in interior Alaska we encounter more battery problems that most drivers. You see, it gets 70°F below zero here at Clear every year. The average is 40° F below. Each spring many of us must replace oil seals on axles, transmissions, etc. The grease even freezes at -70°F so it tears the seals.

Batteries must have warmer blankets wrapped about them to ensure a start in those temperatures. Gear lube must be changed to a very light 10W and standard transmission oil must be changed to a lighter oil, too. Repacking the wheel bearings with a light grease made for sub-zero weather is advised but even it freezes to a thick gooey mess.

M.F. Guggenmos
Clear AFS, AK 99704

Good advice about batteries that we don't repeat often enough. Our tech editor, whose picture it is, says he never gets his face within a foot of the battery, but he's going to wear safety goggles in future pix so everyone gets the right idea. Meanwhile, hope you have a mild winter at Clear AFS!

ANOTHER "SAVED-BY-THE-BELT"

I had been wearing seatbelts ever since coming into the service because of all the safety films and things like DRIVER Magazine. It wasn't three weeks ago I was driving along pulling on my shoulder harness and letting it snap back into place wondering, "Do these things really work?"

The only reason I am able to tell you this story is because they do! My '79 subcompact car is now a ball of metal. I'm sore in a couple of places. But I'm alive and injury-free. I'm a believer!

Capt Lee Shirley, USAF
Norton AFB, CA 92409

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EPITAPH for Mr. HYDE